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Description of a New Species of Terrestrial Isopod, Haloniscus stepheni, from Western Australia,

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The specimens which form the subject of the present communication were collected by one of us (G.E.N.) when on a trip through the northern part of the Wheat Belt in January of this year.

The find was a purely accidental one, a trivial motor defect having caused us to pull up by the bank of the Kokatea Creek; at the particular spot the Creek at this time was dry, but the surface crust, thickly spread with salt crystals, covered a viscid mud beneath.

The weather was intensely hot (115° F., shade temperature), but a slight fall of rain a couple of days earlier had served to effect a temporary moistening of the surface, which persisted in shaded spots. When flowing, the Creek (which had been strongly salt for several years, as was learned from enquiries made locally) discharged into the Greenough River. A few stones resting upon the muddy crust were turned and yielded nothing of interest, but a couple of small logs, in a very decayed state, just upon the upper limit of the Creek bank, concealed each a dozen or so of the Oniscid. They were comparatively small, but their unusual colour (whitish, with dark intestine indicated through translucent body wall) and their exceptionally compressed and elongate shape, marked them as new, and, consequently, as many as possible were collected. They were quite active and a number succeeded in making good their escape down tiny burrows into the softer mud beneath. Undoubtedly they are capable of leading life under terrestrial conditions, but their occurrence upon the banks of a creek which is brackish at the best and predominantly salt, suggested a relationship with forms inhabiting salt waters or the shores of salt lakes. A comparison of our specimens with the description furnished by Chilton of *Haloniscus scarlei*, left us in no doubt of its close re-

lationship with that form. Advantage was taken of the opportunity afforded by a recent visit to Adelaide to examine specimens in the collection of the S.A. Museum, and it then became apparent that our Western Australian form also showed marked affinities with *Philoscia salina* Baker, known only from salt water pools near the South Australian Coast. Chilton states (1920, p. 725) that he had experienced considerable difficulty in assigning the new species to its proper place in the Oniscoidea, and he finally decided to constitute for it a new genus. He pointed out that its nearest affinities with existing genera were with *Philoscia,* from which, however, it differs in a number of characters. Baker, in referring the South Australian species to *Philoscia*, appears to have been unaware of Chilton's paper.

It has seemed best to us to accept Chilton's view of the generic distinctness of this species, and since all three forms are much alike in mode of life (in or upon the shores of salt water), and agree closely in their structural peculiarities, we suggest that Baker's species should be transferred to Haloniscus.

For the West Australian form the name *Haloniscus stepheni* is proposed, the specific designation being in compliment to Mr. Wm. Stephens, of Perth, through whose kindness this collecting trip was rendered possible.

Gen. HALONISCUS. Chilton.

1920, *Haloniscus* (Sp. typ. *H. searlei*). Chas Chilton, Proc. Linn. Soc. N.S.W., Vol. 44, Part 4, p. 723.

Body elongated narrow oval, convex; dorsal surface smooth, covered with fine hairs. Cephalon rounded in front, without lateral lobes. Mesosome with the side plates not greatly expanded. Metasome very slightly narrowed; third, fourth and fifth segments with distinct epimera; last segment large and with well-developed lateral portions; extremity sub-triangular. Eyes present, lateral in position. First antenna minute three-jointed. Second antenna comparatively short, flagellum three-jointed. Legs well developed and increasing in length posteriorly, the anterior four pairs prehensile, more or less sub-chelate; the fifth, sixth and seventh, simple; dactyls bi-unguiculate, without special dactylar seta. Pleopoda conspicuous with well developed opercular plates lacking air cavities. Uropoda exposed, moderately developed, with peduncles reaching beyond the end of metasome; inner ramus attached only slightly in front of the outer.

Remarks:—Closely related to *Philoscia,* but differing from that genus in the scarcely narrowed metasome, the possession of a large terminal segment, with well-developed lateral expansions. Of perhaps lesser importance as distinctive features are the comparatively

short antennae, and the occurrence of definite epimera on third, fourth and fifth segments of the metasome.

With three species:—

H. searlei Chilton, 1920, sp. typ., Proc. Linn. Soc. N.S.W., Vol. 44, p. 723.

H. salina (Baker), 1926, Philoscia s., Baker in Rec. Sth. Austr. Mus., Vol. 3, No. 2, p. 145.

H. stepheni, sp. nov.

Haloniscus stepheni sp. nov.

Specific diagnosis.

Body almost four times as long as broad, with dorsal surface covered with numerous short hairs. Eyes moderately developed. Legs gradually increasing in size posteriorly; the four anterior pairs approximately similar in shape, slightly prehensile, and with their joints more or less rectangular; the fifth intermediate in shape and size; the sixth and seventh similar in shape; pleopods with operecular plates well developed, gradually decreasing in size posteriorly, with the exception of the first pair, which are small and apparently lack setae; endopods of the first and second pairs modified in the male in the usual manner, those of the third, fourth and fifth branchial and comparatively well developed. Uropods moderately exposed with the basal joint reaching slightly beyond the end of the metasome; rami different in shape, the outer three-sided and pointed, the inner tapering to a point, slightly flattened on one side.

Colour: Creamy white, translucent, the food laden intestine visible through the body wall.

Length: Largest specimen about 7 mms.

Locality: Under damp logs by the bank of Kokatea Creek, near Teniindewa.

Detailed description (taken from male specimen):—

The convex *body* is of a long oval shape, the length being almost four times as great as the breadth, and thus notably narrow; the lateral portions are not greatly expanded, the dorsal surface is smooth and covered with numerous minute fine hairs. The *mesosomatic* segments are sub-equal in length; the epimera of the first four are rounded posteriorly, while those of the last three are acutely produced. The *cephalon* is rounded and without lateral lobes. The frontal marginal line of the head is evident throughout its entire length and is bent downward on either side surrounding the epistome, being continuous with the vertical marginal line at the back of the eyes. The *metasome* is without epimera on the first and second segments, these being covered laterally by the last mesosomatic segment, in the extended position; the epimera of

segments three to five are well developed. The first five segments are sub-equal in length, the two anterior being very slightly shorter; the last segment is large, slightly narrower than those preceding, rounded posteriorly and with very evident lateral portions.

The *eyes* are moderately developed, compound, lateral in position.

The *first antenna* (Pl. X, Fig 3) has three joints, the first broader and longer than the second; the third longer and narrower than the second, and bearing at and near the apex a number of stout setae.

The *second antenna* (Pl. X, Fig. 4) has the first three joints of the peduncle more or less sub-equal, the fourth is longer than the third, the fifth as long as the third and fourth combined. The flagellum is approximately equal in length to the last segment of the peduncle, and consists of three joints, the second being the shortest; the third longer than the first and tapering to the apex, which bears a tuft of setae.

The *upper lip* is broader than long, and has the central portion covered and fringed with short setae.

The *right mandible* (Pl. X, Fig. 6) has the outer cutting edge strong and composed of three chitinous teeth; the inner cutting edge is less strongly developed and divided into two teeth; two penicils are present and the usual tuft of long plumose setae; the ciliated lappet is small.

The *left mandible* (Pl. X, Fig. 5) has the outer cutting edge represented by four strong chitinous teeth; the inner is distinctly defined and divided into a number of teeth; three penicils are present, two upper and one lower; ciliated lappet prominent; setae in lowest group long and plumose.

Both the mandibles have the upper distal edge fringed with setae.

The *lower lip* is small, narrow, and has the inner and outer (distal) margins fringed with setae, also the surface near the inner margin.

The *first maxilla* (Fig. 1, 1) has the external margin of the outer lobe slightly sinuous and fringed distally with a number of fine setae; the apex bears eight or nine setae, the four outer darker in colour and stronger than the inner. The inner lobe is more delicate and about half its width; the outer margin bears a number of fine setae distally; at the apex are the usual two plumose setae, which are short and stout.

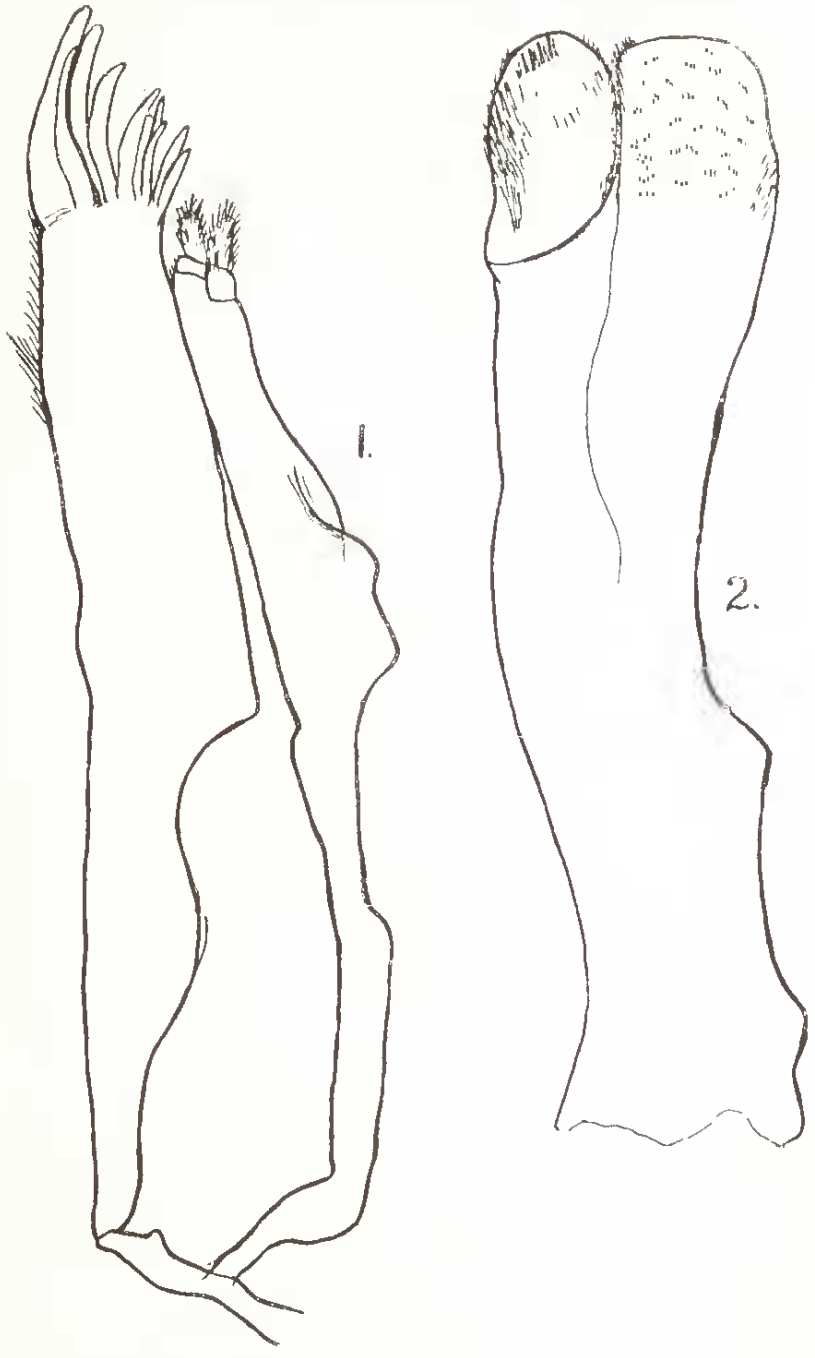

FIG. 1.—*Haloniscus stephensi.* 1, 1st Maxilla; 2, 2nd Maxilla.

The *second maxilla* (Fig. 1, 2) is delicate, the outer lobe broad and clothed apically with numerous fine setae. Its internal margin bears a number of longer and stronger setae. The inner lobe is narrower and more strongly chitinized, and bears numerous setae of different forms, a group of about nine or ten near the inner apex being thick and strong.

The *maxilliped* (Pl. X, Figs. 7, 8) has the basal joints broad and rectangular; in the palp the first joint only is well defined and bears a couple of spines. The three terminal joints are coalesced into a single piece, the extent of each joint being indicated only by the position of a group of setae. Slightly shorter than the palp,

the truncate masticatory lobe bears sub-apically a penicillum, and apically is beset with short setae. The epipod is very considerably more than half the combined length of the basal joints.

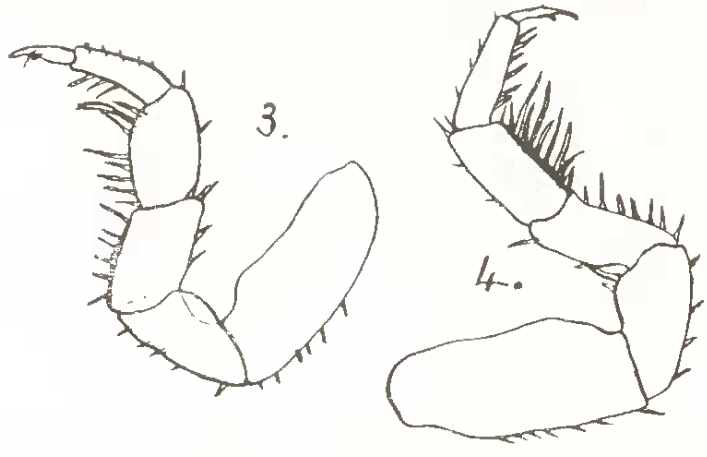

FIG. 2.— *Haloniscus stephcni*...3, 1st pair of legs; 4, 2nd pair of legs.

The *first pair of legs* (Fig. 2, 3) is short, most of the joints being roughly rectangular in form, the ischium, however, being sub-triangular; the dactyl slender, bi-unguiculate and without a special dactylar seta. The propod is narrow, and has a number of stout setae on the inner side; with the dactyl it forms upon the carpus a prehensile structure. The inner sides of the carpus and merus bear a number of long stout setae similar to those on the propod.

The *second pair of legs* (Fig. 2, 4) is longer than the first, with the carpus and merus slightly narrower than those of the first pair. The propod and dactyl are similar, but longer. The spines on the carpus are much longer, those on the propod and merus more numerous.

The *third and fourth pairs of legs* are similar to the second

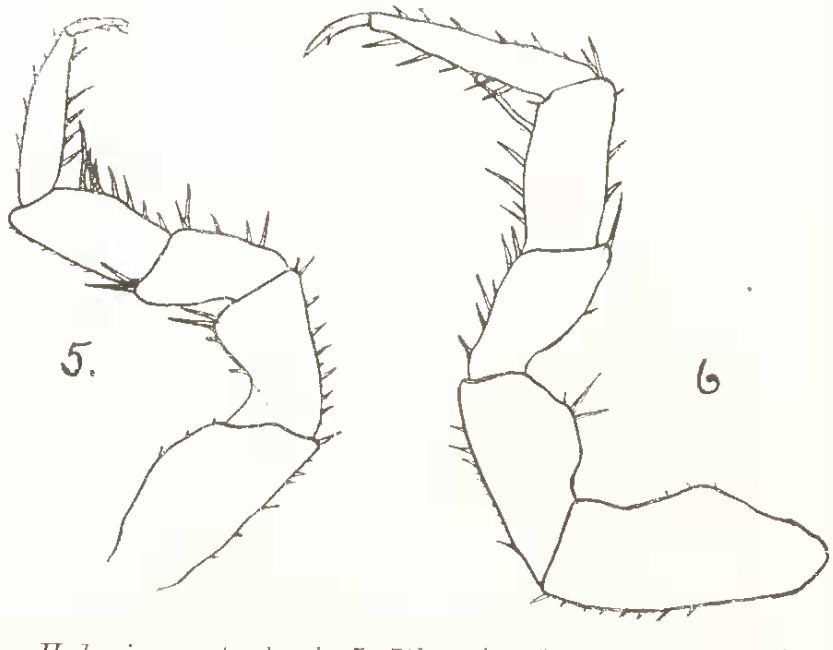

FIG. 3.—*Haloniscus stephcni.* 5, 5th pair of legs; 6, 7th pair of legs.

pair, but less sub-chelate, each slightly longer than the preceding. The spines on the propod, carpus and merus are more scattered.

The *fifth pair of legs* (Fig. 3, 5) is longer than the fourth, and intermediate in character between those of the anterior group and the following.

The *sixth and seventh pairs* (Fig. 3, 6) are similar in shape, the seventh longer than the sixth, both distinctly longer and stouter than the fifth pair. The spines are more sparse. The ischium bears a number of fine setae on its anterior border.

The *first pair of pleopods* in the male (Pl. X, Fig. 9) has the usual structure, the exopods delicate and slightly rounded, with no suggestion of setae. The endopod is modified, broad at the base and tapering to the apex, grooved on the inner margin. The endopods are approximately twice the length of the exopods. The male organ is single and tapering, reaching to the ends of the exopods.

In the *second pair of pleopods* (Pl. X, Fig. 10) the exopods differ from those of the first pair, being longer and broader, and pointed at their apices. The inner margin is fringed with fine setae, which increase in length posteriorly. The outer margin bears a few spinous setae together with numerous fine setae. The slender endopods extend beyond the exopods and taper to a fine point.

The *third, fourth, and fifth pairs of pleopods* (Pl. X, Fig. 11, 12, 13) are similar in shape, but become gradually smaller. The exopods are more or less pear-shaped with their inner margins fringed with fine setae, the outer bearing a number of long and stout spine-like setae interspersed with finer setae. The endopods are moderately developed, irregular in shape, and have the usual branchial function.

In all of the pleopods the peduncles are well developed.

In the *uropods* (Pl. X, Fig. 14) the basal joint is roughly quadrilateral in shape, almost as broad as long. The outer ramus is three sided and pointed, grooved externally. Apically it bears a number of long, fine setae. The inner ramus tapers to a point, is slightly flattened on one side and grooved as in the outer ramus. It is inserted only slightly anteriorly to the outer and is more than half the length of the latter.

The greater number of specimens collected are males, a fact which could readily be made out by an inspection of the endopods of the first two pairs of pleopods; of the remainder, none bear eggs and cannot be definitely recognised as females. In all, the body has the same general structure. The specimens were preserved in strong alcohol, and all had become dorsally flexed, some very strongly indeed.

H. stepheni may readily be recognised from its congeners by its extremely narrow body, four times as long as wide, the length in *H. salina* being less than three times the width, while in *H. scarlei* the breadth is relatively greater still, being little less than half the length. The translucency of H. stepheni seems to be peculiar, also, and suggests that living as it does in an area of much lighter rainfall, and subjected to much greater risk of dessication, it has become habituated to lengthy periods of subterranean life, this burrowing habit doubtless being associated with the attenuated form of the body.

The eye of *H. stepheni* is intermediate in size between that of *H. scarlei*, which is much larger, and that of *H. salina*, which is distinctly smaller.

In the general rectangular shape of the joints of the legs *H. stepheni* differs from both of the other species. In none of our specimens was the merus broadened as it is said to be in *H. scarlei* and *H. salina*. The relatively considerable length of the endopodites of the pleopods 1 and 2 also appears to be peculiar to *H. stepheni*. In its telson it resembles *H. salina*, the lateral portions of this region being much more evident in *H. scarlei*.

The discovery of a third species of this genus, which, unlike the other two forms, is capable of living out of water, is of considerable interest.

Chilton, in his discussion (1920, pp. 732-4) on the occurrence and origin of *H. scarlei*, comes to the conclusion that that form is to be regarded as a terrestrial form which has become adapted to an aquatic existence, rather than a marine form cut off from its oceanic connections and surviving in salt lakes, his conclusion being strengthened by the evidence that Lake Corangamite is not of marine origin.

In *H. salina* we have equally an aquatic form living in the muddy border of a small coastal salt lake of a high degree of

salinity, in a depth of six feet of water. All were taken well away from the shore and it is stated (1926, p. 145) that none were found under debris on the shore—though carefully sought for. This little crustacean is said also to occur in other salt lakes in the neighbourhood.

Our specimens found near Teuindewa were, as stated above, found on land, though evidently at the surface from burrows extending down into moist salt-impregnated mud. There is no means of knowing whether, in wetter conditions, the animals would have been found actually in the water.* There are, in the near vicinity, no salt lakes, although some exist at a distance of about 50 miles to the east. A few weeks earlier there had been unusual and heavy summer storms, and many creeks were flowing out of season, so that these small forms might easily have been carried for a considerable distance. The creek is, however, normally regarded as a salt creek, and was described as having been at this season rather less salt than usual. The visible salt at the surface suggested a considerable degree of salinity. It is possible, however, that the sea in Miocene times extended northwards from the Bight towards this southern fringe of the Murchison country, and we may perhaps regard these isolated forms as survivors of a definitely terrestrial, but coast-haunting form which once was distributed along the entire Southern Australian shore in Mid-tertiary times and which have remained as tolerant of salt as those recognised coastal forms, the Scyphacidae.

*It is my custom, when taking small crustaceans from the borders of streams or lakes, to ascertain by experiment, whether or no they will survive for any length of time in water. Unfortunately, on this occasion the experiment was not made, no water being available.—G.E.N.

List of References.

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1901 Chilton: Trans. Linn. Soc. London Zool., Vol. VIII, Pt. IV, p. 136.

1920 Chilton: Proc. Linn. Soc. NS.W., Vol. XLIV, Part 4, 1919, p. 723-734.

1926 Baker: Rec. S. Aust. Mus., Vol. III, No. 2, p. 145, Text Fig. 77.

EXPLANATION OF PLATE X.

All figures refer to *H. stepheni*, and are drawn from a male specimen.

1.—Lateral view of entire animal. x14.

2.—Dorsal view of entire animal. x10.

3.—Antennule. x75.

4.—Right antenna. x32.

5.—Terminal portion of left mandible. x39.

6.—Terminal portion of right mandible. x39.

7.—Right maxilliped seen from ventral surface. x33.

8.—Terminal portion of left maxilliped in ventral view. x39.

9.—1st pleopod of male. x33.

10.—2nd pleopod of male. x33.

11.—3rd pleopod of male. x33.

12.—4th pleopod of male. x33.

13.—5th pleopod of male. x33.

14.—Terminal segment and uropods, dorsal view. x27.

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